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ABSTRACT

To test the effects of teaching inner-city black children to read in kindergarten and first grade through the initial teaching alphabet, i.t.a. and traditional orthography (TO) groups were compared on their comprehension of single words, short sentences, and related skills. At the first grade level, reading, writing, and oral language skills were compared. At the end of kindergarten the results revealed: (1) no significant difference between i.t.a. and TO groups on the Metropolitan Readiness combined scores, (2) the i.t.a. subjects performed significantly higher than TO subjects on all Early Reading subtests, (3) interactions between program and teacher (or school) were significant on all Early Reading subtests. In grade one the i.t.a. subjects continued to use the i.t.a. program, while the TO subjects were instructed with the Scott, Foresman reading program. The first grade results indicated: (1) i.t.a. subjects achieved higher than TO subjects on all Stanford subtests, (2) i.t.a. subjects were better spellers and (3) could pronounce more words, had greater range of comprehension on oral reading, and seemed to read more library books; furthermore, (4) i.t.a. subjects wrote more fluently, and (5) their oral output was greater and more varied than oral output of TO subjects. (WR)

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# Effects of Teaching i.t.a. to Inner-city Black Children in Kindergarten and First Grade[1]

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This report is concerned with a study of the effects of teaching inner-city black children to read in kindergarten and first grade through i.t.a. (initial teaching alphabet). Two major questions were investigated: (1) Can inner-city black children learn to read in kindergarten using the medium of i.t.a.? (2) Does i.t.a. help inner-city black children improve proficiency in reading and other language skills?

To establish a baseline for assessing i.t.a. effects, a control group that used the traditional T.O. (traditional orthography) program currently in use in the system was selected within the school district. At the kindergarten level, i.t.a. and T.O. groups were compared on their comprehension of single words and short sentences and on related skills such as letter-sound association. At the first grade level, the attainments of the two groups on reading, writing and oral language skills were compared.

## Kindergarten

The study was launched in the 1969-70 school year. Four kindergarten teachers from four schools in an urban school system volunteered to participate in the study. Each teacher taught one i.t.a. class and one T.O. class. Assignment of reading program to morning or afternoon class was on a random basis. Students in these classes were randomly chosen from students entering kindergarten in each school.

The i.t.a. classes used the i.t.a. program developed by the i.t.a. Department at the Educational Research Council of America (ERC). Three T.O. classes did not use any structured reading program except for the readiness exercises used in the schools. One T.O. class, however, deviated from the research design and was introduced to the Scott, Foresman program.

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1 A paper presented at the annual meeting of the American Educational Research Association in Chicago in April, 1972.

The data processing was carried out at the University of Illinois Computer Center with the advice and assistance from Dr. Maurice Tatsuoka and Kikumi Tatsuoka.

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Three subtests of the Metropolitan Readiness Test, Word Reading, Listening and Matching, were administered at the beginning of the school year. The Alphabet, Numbers and Copying subtests were omitted as they were too difficult for these students. Reading achievement was assessed at the end of the year with the Early Reading Test developed by the i.t.a. Department of ERC. The Early Reading Test is composed of four subtests:

(1) Auditory-Visual Discrimination: The student is asked to select which of four printed symbols has the same sound as that which the examiner has pronounced.

(2) Sound-Symbol Identification: The student is asked to select from four printed symbols the one having the same sound as the first, middle or last sound of a pictured object.

(3) Word Recognition: The student is asked to select the one of four printed words which is the same as that pronounced by the examiner.

(4) Meaning:

  (a) Words: The student is asked to select the one of four printed words which names a pictured object.

  (b) Sentences: The student is asked to select the one of three short printed sentences which describes an illustrated situation.

The correct response to each item in the entire test has the same spelling in both i.t.a. and T.O.

A preliminary two-way analysis of variance (program x teacher, which is the same as program x school) was conducted on the combined Metropolitan Readiness score (i.e., the total score of Word Meaning, Listening and Matching) and on each of the Early Reading subtests. The results revealed the following:

(1) There was no significant difference between i.t.a. and T.O. groups on the Metropolitan Readiness combined score. However, performances of students in different schools were significantly different.

(2) The i.t.a. students performed significantly higher than the T.O. students on all Early Reading subtests.

(3) Interactions between program and teacher (or school) were significant on all Early Reading subtests.

In order to further clarify the meanings of the significant program effects and the significant interactions, scores on all Early Reading subtests were reanalyzed using an analysis of covariance technique (program x school), with the Readiness score as the covariate.[1] The within-groups regression coefficients and correlation coefficients are presented in Table 1. Summary of the analyses of covariance, sample sizes and adjusted means on the four Early Reading subtests are given in Tables 2 - 3 on page 4.

TABLE 1

Kindergarten — Early Reading Tests: Within-groups raw score regression coefficients and correlation coefficients

| Dependent Variables | Within-Groups | |
|---|---|---|
| | b | r |
| Early Reading Test Scores | | |
| Audio-Visual Discrimination | .162395 | .2206 |
| Sound-Symbol Identification | .218019 | .3067 |
| Word Recognition | .237487 | .2728 |
| Word Meaning | .148141 | .2439 |

Program effects on all subtests were significant and were in favor of the i.t.a. group, even with adjustments for initial readiness. School effects were also significant on all subtests in favor of schools 3 and 4, but the interactions of school and method were only significant on the Audio-Visual

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[1] t-tests were conducted for the i.t.a. group and T.O. group respectively on the basis of the Metropolitan Readiness scores to compare students who were used in the analyses of covariance and those who were dropped because of lack of data on the Metropolitan Readiness Test or the Early Reading Test. No significant differences were found.

TABLE 2

Kindergarten — Early Reading Test: Analyses of Covariance

| Source of Variance | AUDIO-VISUAL DISCRIMINATION | | | SOUND-SYMBOL IDENTIFICATION | | | WORD RECOGNITION | | | WORD MEANING | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Squares | d.f. | F | Mean Squares | d.f. | F | Mean Squares | d.f. | F | Mean Squares | d.f. | F |
| A (Program) | 738.5339 | 1 | 51.98*** | 391.5588 | 1 | 31.03*** | 315.3098 | 1 | 16.32*** | 59.2219 | 1 | 6.1917** |
| B (School) | 177.4648 | 3 | 12.49*** | 138.8133 | 3 | 11.00*** | 385.0837 | 3 | 19.93*** | 177.8040 | 3 | 18.59 *** |
| A x B | 146.1922 | 3 | 10.29*** | 46.5356 | 3 | 3.69** | 25.6689 | 3 | 1.33 | 16.2380 | 3 | 1.70 |
| Error | 12.2077 | 148 | — | 12.6173 | 148 | — | 19.3223 | 148 | — | 9.5647 | 148 | — |

* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 3

Kindergarten — Early Reading Test: Sample sizes, means on the covariate, and adjusted means

| Reading Programs | Schools | Number of Pupils | Means on Metropolitan Reading Test (Kindergarten) | AUDIO-VISUAL DISCRIMINATION | SOUND-SYMBOL IDENTIFICATION | WORD RECOGNITION | WORD MEANING |
|---|---|---|---|---|---|---|---|
| | | | | Adjusted Mean | Adjusted Mean | Adjusted Mean | Adjusted Mean |
| i.t.a. | 1 | 13 | 14.846 | 10.454 | 9.119 | 7.801 | 3.232 |
| | 2 | 15 | 14.400 | 10.189 | 9.385 | 6.717 | 3.990 |
| | 3 | 24 | 16.583 | 15.092 | 12.717 | 9.215 | 4.583 |
| | 4 | 19 | 14.526 | 13.336 | 11.168 | 12.165 | 7.024 |
| | Total | 71 | 15.253 | 12.737 | 10.940 | 9.218 | 4.864 |
| T.O. | 1 | 29 | 11.897 | 6.981 | 5.221 | 4.888 | 2.499 |
| | 2 | 16 | 12.313 | 7.203 | 7.753 | 2.042 | 1.862 |
| | 3 | 19 | 16.158 | 5.861 | 7.760 | 6.092 | 2.308 |
| | 4 | 22 | 14.455 | 13.025 | 10.973 | 11.562 | 7.482 |
| | Total | 86 | 13.570 | 8.321 | 7.724 | 6.332 | 3.613 |

Discrimination and Sound-Symbol Identification subtests. These significant interactions may be attributable to the introduction of the Scott, Foresman program in school 4's T.O. class. In school 4, only slight differences were noted between the i.t.a. and T.O. classes, while in the other three schools i.t.a. classes markedly and consistently outperformed the T.O. classes.

This study demonstrates that it is feasible to use i.t.a. to teach reading skills to inner-city black children in kindergarten and that greater attainment of these skills was made by the i.t.a. students than by the T.O. students who used the more traditional program in this urban school system. Whether T.O. may be taught with equal success in kindergarten as suggested by the success of the T.O. class in school 4 is still open to further research.

Grade One

1970-71 marked the second year of the study. In grade one, all four i.t.a. classes were kept intact, but the T.O. students were distributed into eight classes. The i.t.a. students continued to use ERC's i.t.a. program, while the T.O. students were instructed with the Scott, Foresman reading program. All classes in i.t.a. and T.O. were taught by different teachers.

The following instruments were used to determine the student's readiness level and achievement in reading, writing and oral language.

(1) Readiness: The entire battery of the Metropolitan Readiness Tests, Form B (in September, 1970).

(2) Reading achievement and related skills:

(a) The Word Reading, Paragraph Meaning, Vocabulary and Word Study Skills subtests of the Stanford Achievement Test, Primary I, Form W (in May, 1971).

The i.t.a. students and the T.O. students took the subtests in their own instructional medium.

(b) A spelling test developed by ERC's i.t.a. Department which included words from grade one through grade six vocabulary (in April, 1971).

The first ten words were chosen from the Spelling subtest of the Stanford Achievement Test, Primary I, Forms W, X, Y. They also appear in the Clarence R. Stone's Revision of the Dale List of 769 easy words. The next five words came from A Reading Vocabulary for the Primary Grades (revised and

enlarged by Arthur Gates, 1935). The last five words were selected from spelling lists for grades 4 - 6 in the Basic Spelling Keys, Books 4, 5 and 6 (J. B. Lippincott Company, 1967). All twenty words are spelled the same in i.t.a. and T.O.

(c) An individually administered Paragraph Reading Test developed by ERC's i.t.a. Department, adopted from a technique described by Biemiller[1] (in April, 1971).

The paragraph contains 58 words and was presented in either i.t.a. or T.O. according to the student's reading medium. The student was first asked to read the paragraph. Errors made in reading (e.g., words not known, substitution of words, omission of words, and insertion of words), attempts made to correct the errors, and the amount of time required for reading the paragraph were recorded. After the students completed reading the paragraph, three questions were asked about the paragraph. The first question was factual and the student was allowed to make reference to the paragraph. The second question was also factual, but no reference to the paragraph was allowed. The third question was inferential and again reference to the paragraph was not allowed. The student's responses were recorded in these categories: correct or incorrect and word, phrase or sentence.

(3) Writing: An essay written to a picture stimulus (in April, 1971).

Students were presented a picture of a black boy holding a teddy bear and looking at a dog in a box feeding her pups. The dog's feeding dish was in the foreground. Students were instructed to write what they saw in the picture or what they thought might happen next. They were encouraged to write the words they thought should be written, even though they might not know how to spell them.

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[1] Andrew Biemiller "The development of the use of graphic and contextual information as children learn to read." Reading Research Quarterly, VI, No. 1, pp. 75-96.

(4) Oral Language:[1] An individual interview with a picture stimulus (in April, 1971).

Each student was presented a picture of a black boy and a black girl reading at a table and was prodded to respond orally to the picture with the following statements or questions:

(a) "Tell me a story about this picture." (If the student told a story not related to the stimulus, the interviewer directed him to tell a story about the picture.)

(b) "Tell me more about it." (This prod was not used if the student was talkative.)

(c) "Tell me, how do the people in the picture feel?"

(d) "Tell me, why do they feel [exact repeat of what the student said] ?"

(e) "Tell me, how do you feel when you read?"

(f) "Why do you feel [exact repeat of what the student said] when you read?"

(g) "Use other words to tell me how you feel when you read."

(h) "Is there anything else?"

Each interview was tape recorded. Prior to the interview, students were warmed-up with a different picture and similar activity in their classroom.

(5) Other indirect measures used to gauge the students' reading and writing:

(a) Number of library books read by the i.t.a. and T.O. students during April, 1971.

(b) Number of pieces of creative writing produced by the i.t.a. and T.O. students during April, 1971.

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[1] The interview technique was devised by Edwin F. Sause. A more detailed description of the interview technique is presented in a paper by Edwin F. Sause and Fredrick E. Menz, "Evaluating Inner-city Children's Achievement in Language Skills" (Paper presented at AERA, Chicago, 1972).

Eleven two-way analyses of covariance (program x school), using the first grade total Metropolitan Readiness score as the covariate, were conducted on the following variables:

1. Stanford Word Reading: Raw Score.
2. Stanford Paragraph Meaning: Raw Score.
3. Stanford Vocabulary: Raw Score.
4. Stanford Word Study Skills: Raw Score.
5. Spelling Test: Total number of correctly spelled words.
6. Paragraph Reading: Total number of errors made by student.
7. Paragraph Reading: Number of minutes required by student to read paragraph.
8. Paragraph Writing: Number of different words used by student in essay.
9. Paragraph Writing: Total number of words used by student in essay.
10. Oral Language: Number of different words used by student in interview.
11. Oral Language: Total number of words used by student in interview.

Within-groups regression coefficients, within-groups correlation coefficients, summaries of the analyses of covariance, sample sizes and adjusted means on the dependent variables are presented in Tables 4 - 14.

TABLE 4

Grade 1 — Within group raw score regression coefficients and correlation coefficients for the several dependent variables

| Dependent Variables | Within Groups | |
|---|---|---|
| | b | r |
| Stanford Achievement Test | | |
| Word Reading | .332033 | .6047 |
| Paragraph Meaning | .363535 | .5762 |
| Vocabulary | .214952 | .5847 |
| Word Study Skills | .380493 | .5833 |
| Spelling Test | .160090 | .5175 |
| Paragraph Reading | | |
| Number of Errors | -.765110 | -.6228 |
| Number of Minutes | -.042223 | -.3825 |
| Paragraph Writing | | |
| Number of Different Words | .232879 | .4913 |
| Total Number of Words | .368396 | .4919 |
| Oral Language Sample | | |
| Number of Different Words | .062785 | .0411 |
| Total Number of Words | .168879 | .0338 |

TABLE 5

Grade 1 — Stanford Achievement Test: Analyses of Covariance

| Source of Variance | WORD READING | | | PARAGRAPH MEANING | | | VOCABULARY | | | WORD STUDY SKILLS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean Squares | d.f. | F | Mean Squares | d.f. | F | Mean Squares | d.f. | F | Mean Squares | d.f. | F |
| A (Program) | 1006.0288 | 1 | 27.69*** | 1026.3633 | 1 | 20.33*** | 78.0876 | 1 | 4.62 * | 1418.7578 | 1 | 26.61*** |
| B (School) | 28.0613 | 3 | 0.77 | 93.4727 | 3 | 1.85 | 31.9328 | 3 | 1.89 | 13.2253 | 3 | 0.25 |
| A x B | 115.0633 | 3 | 3.17* | 184.4479 | 3 | 3.65* | 22.7751 | 3 | 1.35 | 163.1081 | 3 | 3.06* |
| Error | 36.3301 | 95 | — | 50.489 | 95 | — | 16.893 | 95 | — | 53.323 | 95 | — |

* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 6

Grade 1 — Stanford Achievement Test: Sample sizes, means on the covariate, adjusted raw score means, and mean grade equivalents[1]

| Reading Programs | Schools | Number of Pupils | Means on Metropolitan Readiness (Grade 1) | WORD READING | | PARAGRAPH MEANING | | VOCABULARY | | WORD STUDY SKILLS | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Adjusted Mean | Grade Equiv. | Adjusted Mean | Grade Equiv. | Adjusted Mean | Grade Equiv. | Adjusted Mean | Grade Equiv. |
| i.t.a. | 1 | 11 | 45.000 | 21.409 | 1.8 | 17.157 | 1.7 | 20.292 | 1.7 | 39.175 | 2.0 |
| | 2 | 10 | 44.600 | 19.769 | 1.7 | 16.884 | 1.7 | 19.269 | 1.6 | 34.700 | 1.8 |
| | 3 | 16 | 58.875 | 25.092 | 2.0 | 22.420 | 1.8 | 19.463 | 1.6 | 41.731 | 2.3 |
| | 4 | 15 | 55.667 | 22.527 | 1.9 | 20.928 | 1.8 | 20.557 | 1.8 | 38.056 | 2.0 |
| | Total | 52 | 52.269 | 22.549 | 1.9 | 19.812 | 1.7 | 19.917 | 1.7 | 38.778 | 2.0 |
| T.O. | 1 | 21 | 40.524 | 18.384 | 1.7 | 14.966 | 1.6 | 18.678 | 1.6 | 31.770 | 1.6 |
| | 2 | 10 | 60.400 | 15.723 | 1.6 | 11.540 | 1.5 | 19.773 | 1.7 | 32.988 | 1.7 |
| | 3 | 12 | 52.083 | 12.784 | 1.4 | 8.931 | 1.5 | 15.110 | 1.4 | 27.586 | 1.5 |
| | 4 | 9 | 61.222 | 16.861 | 1.6 | 18.441 | 1.7 | 19.340 | 1.6 | 33.719 | 1.8 |
| | Total | 52 | 50.596 | 16.316 | 1.6 | 13.516 | 1.6 | 18.180 | 1.5 | 31.376 | 1.6 |

[1] Mean grade equivalent scores are based on adjusted raw score means.

TABLE 7

Grade 1 — Spelling Test: Analysis of Covariance

| Source of Variance | SPELLING SCORE | | |
|---|---|---|---|
| | Mean Squares | d.f. | F |
| A (Program) | 299.1279 | 1 | 27.08*** |
| B (School) | 46.6877 | 3 | 4.23** |
| A x B | 41.9887 | 3 | 3.80** |
| Error | 11.0462 | 72 | — |

* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 8

Grade 1 — Spelling Test:
Sample sizes, means on the covariate, and the adjusted raw score mean

| Reading Programs | Schools | No. of Pupils | Means on Metropolitan Readiness (Grade 1) | Spelling Adjusted Mean |
|---|---|---|---|---|
| i.t.a. | 1 | 9 | 46.667 | 11.540 |
| | 2 | 1 | 35.000 | 6.186 |
| | 3 | 16 | 58.875 | 11.552 |
| | 4 | 14 | 58.214 | 9.756 |
| | Total | 40 | 55.300 | 10.787 |
| T.O. | 1 | 16 | 42.813 | 9.310 |
| | 2 | 8 | 63.875 | 8.313 |
| | 3 | 6 | 60.667 | 3.577 |
| | 4 | 11 | 61.364 | 4.329 |
| | Total | 41 | 54.513 | 6.940 |

TABLE 9

Grade 1 — Paragraph Reading: Analyses of Covariance

| Source of Variance | Errors | | | Minutes | | |
|---|---|---|---|---|---|---|
| | Mean Squares | d.f. | F | Mean Squares | d.f. | F |
| A (Program) | 3541.3242 | 1 | 20.75*** | 1.2159 | 1 | 0.70 |
| B (School) | 120.3659 | 3 | 0.71 | 1.9921 | 3 | 1.15 |
| A x B | 703.5415 | 3 | 4.12** | 3.8551 | 3 | 2.23 |
| Error | 170.6461 | 95 | — | 1.7280 | 78 | — |

* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 10

Grade 1 — Paragraph Reading:
Sample sizes, means on the covariate, and adjusted raw score means

| Reading Programs | Schools | No. of Pupils | Means on Metropolitan Readiness (Grade 1) | Errors Adjusted Mean | No. of Pupils | Means on Metropolitan Readiness (Grade 1) | Minutes Adjusted Mean |
|---|---|---|---|---|---|---|---|
| i.t.a. | 1 | 10 | 45.400 | 20.128 | 9 | 47.444 | 2.541 |
| | 2 | 10 | 44.600 | 13.816 | 9 | 47.444 | 3.040 |
| | 3 | 16 | 58.875 | 11.863 | 16 | 58.875 | 1.972 |
| | 4 | 15 | 55.667 | 14.217 | 14 | 58.214 | 3.145 |
| | Total | 51 | 52.490 | 14.559 | 48 | 54.396 | 2.621 |
| T.O. | 1 | 20 | 40.250 | 19.788 | 13 | 43.615 | 2.879 |
| | 2 | 8 | 60.500 | 29.357 | 7 | 64.429 | 3.318 |
| | 3 | 11 | 50.273 | 36.521 | 6 | 55.167 | 3.284 |
| | 4 | 14 | 58.857 | 25.725 | 13 | 59.154 | 2.395 |
| | Total | 53 | 50.302 | 26.274 | 39 | 54.308 | 2.859 |

TABLE 11

Grade 1 — Paragraph Writing: Analyses of Covariance

| Source of Variance | Different Words | | | Total Words | | |
|---|---|---|---|---|---|---|
| | Mean Squares | d.f. | F | Mean Squares | d.f. | F |
| A (Program) | 533.8140 | 1 | 15.83*** | 858.2578 | 1 | 10.20** |
| B (School) | 37.5513 | 3 | 1.11 | 253.4896 | 3 | 3.01* |
| A x B | 267.3398 | 3 | 7.93*** | 894.8997 | 3 | 10.64*** |
| Error | 33.7266 | 76 | — | 84.1259 | 76 | — |

* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 12

Grade 1 — Paragraph Writing:
Sample sizes, means on the covariate, and adjusted raw score means

| Reading Programs | Schools | No. of Pupils | Means on Metropolitan Readiness (Grade 1) | Different Words | Total Words |
|---|---|---|---|---|---|
| | | | | Adjusted Mean | Adjusted Mean |
| i.t.a. | 1 | 9 | 46.667 | 10.495 | 14.634 |
| | 2 | 8 | 49.000 | 17.216 | 27.706 |
| | 3 | 16 | 58.875 | 20.479 | 31.193 |
| | 4 | 8 | 51.375 | 17.788 | 22.706 |
| | Total | 41 | 52.805 | 17.126 | 25.222 |
| T.O. | 1 | 16 | 42.375 | 15.384 | 26.834 |
| | 2 | 9 | 59.222 | 12.572 | 18.121 |
| | 3 | 6 | 55.167 | 8.905 | 12.892 |
| | 4 | 13 | 58.846 | 9.240 | 12.318 |
| | Total | 44 | 52.432 | 12.110 | 18.862 |

TABLE 13

Grade 1 -- Oral Language: Analyses of Covariance

| Source of Variance | Different Words | | | Total Words | | |
|---|---|---|---|---|---|---|
| | Mean Squares | d.f. | F | Mean Squares | d.f. | F |
| A (Program) | 2824.1953 | 1 | 6.82** | 22723.6875 | 1 | 5.10* |
| B (School) | 931.0806 | 3 | 2.25 | 7744.2266 | 3 | 1.74 |
| A x B | 1586.8813 | 3 | 3.83** | 12651.5820 | 3 | 2.84* |
| Error | 414.0288 | 84 | — | 4452.2969 | 84 | — |

* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 14

Grade 1 — Oral Language:
Sample sizes, means on the covariate, and adjusted raw score means

| Reading Programs | Schools | No. of Pupils | Means on Metropolitan Readiness (Grade 1) | Different Words | Total Words |
|---|---|---|---|---|---|
| | | | | Adjusted Mean | Adjusted Mean |
| i.t.a. | 1 | 9 | 46.667 | 42.020 | 90.572 |
| | 2 | 9 | 43.444 | 42.111 | 94.605 |
| | 3 | 16 | 58.875 | 36.962 | 68.826 |
| | 4 | 14 | 58.214 | 63.771 | 152.571 |
| | Total | 48 | 53.500 | 46.695 | 102.163 |
| T.O. | 1 | 18 | 40.389 | 35.525 | 73.454 |
| | 2 | 8 | 60.500 | 26.110 | 51.114 |
| | 3 | 8 | 51.750 | 47.659 | 93.341 |
| | 4 | 11 | 60.909 | 33.913 | 63.453 |
| | Total | 45 | 51.000 | 35.614 | 70.573 |

It is evident in Tables 6, 8, 10, 12 and 14 that the numbers of students included in the first grade analyses were less than the original sample size in the kindergarten analyses, and that the sample sizes were different across the first grade analyses. Aside from normal attrition, the first grade sample size variability resulted from an attempt to include as many students as possible in each analysis. To ensure that the grade 1 samples were not significantly different from the kindergarten samples, t tests were conducted on the basis of the kindergarten Metropolitan Readiness combined scores to compare students included in the first grade analysis with those dropped from the first grade but included in the kindergarten analyses for the i.t.a. groups and the T.O. groups respectively. No significant differences were found in either contrast, and the observed loss of subjects in first grade does not seem to alter the character of the samples involved in the kindergarten and the first grade analyses, as measured with the Metropolitan Readiness subtests.

Program effects were significant on all dependent variables, favoring the i.t.a. group except for Paragraph Reading - number of minutes (Tables 5, 7, 9, 11 and 13). Although no significant difference was found between the i.t.a. group and the T.O. group on the number of minutes required to read the paragraph, the result might be different if the 7.8% of the i.t.a. students and 20.8% of the T.O. students who were not able to read the paragraph were included in the analysis. School effects were significant on only two variables: Paragraph Writing - total number of words (Table 11) and Spelling (Table 7). Program by school interactions were significant on all variables, with the exception of the Stanford Vocabulary subtest. These significant interactions can be attributed to deviation of performances of the i.t.a. class and T.O. class within a single school (and infrequently two schools) from the general trends of the program effects. Only rarely did a T.O. class outperform an i.t.a. class within a given school. (See Appendix, Figures 1-11.)

Analyses of the data collected on the number of library books read and the number of creative writing produced during April, 1971 were purely descriptive in nature. The results are given in Appendix, Tables I-4 and I-5. Although no information was available as to the type and length of the books read or the quality and creativity of the writing, these data do indicate a trend favorable to the i.t.a. students.

All the first grade results indicate an affirmative response to the second question posed in the study. Conclusions may be summarized as below:

(1) Reading achievement and related reading skills:

(a) i.t.a. students achieved consistently higher than T.O. students on all Stanford subtests: Word Reading,

Paragraph Meaning, Vocabulary and Word Study Skills.

(b) The i.t.a. students were better spellers and were able to spell words of a wider range of difficulty than the T.O. students. (See Appendix, Table I-1 for a breakdown analysis of types of responses made by the i.t.a. and T.O. students.)

(c) The i.t.a. students could pronounce more words than the T.O. students. They seemed to have greater comprehension on what they read orally than the T.O. students. (See Appendix, Table I-3.) They also seemed to read more library books than the T.O. students. (See Appendix, Table I-5.)

(2) Writing: i.t.a. students wrote more fluently and used a richer vocabulary than T.O. students. There seems to be a tendency that they produced more creative writing than the T.O. students. (See Appendix, Table I-4.)

(3) Oral Language: Oral output of the i.t.a. students was greater and more varied than the oral output of the T.O. students.

WCH:gh
April, 1972

# A P P E N D I X

TABLE I-1

The performances of i.t.a. and T.O. first grade students on a twenty item Spelling Test

| Words and Category of Words | i.t.a. Average Percent | | | T.O. Average Percent | | |
|---|---|---|---|---|---|---|
| | Right | Wrong | Blank | Right | Wrong | Blank |
| Familiar Words in Grade 1 | | | | | | |
| AND | 90.0 | 8.0 | 2.0 | 60.9 | 34.6 | 4.5 |
| WILL | 76.0 | 24.0 | — | 56.4 | 37.2 | 6.4 |
| HAD | 66.0 | 32.0 | 2.0 | 31.4 | 59.0 | 9.6 |
| SWIM | 58.0 | 42.0 | — | 19.2 | 75.0 | 5.8 |
| IT | 88.0 | 8.0 | 4.0 | 49.4 | 41.0 | 9.6 |
| RUN | 76.0 | 22.0 | 2.0 | 54.5 | 35.3 | 10.2 |
| LAST | 62.0 | 34.0 | 4.0 | 18.6 | 66.7 | 14.7 |
| DOG | 90.0 | 10.0 | — | 47.4 | 41.0 | 11.6 |
| CAN | 76.0 | 22.0 | 2.0 | 46.8 | 40.4 | 12.8 |
| DID | 74.0 | 20.0 | 6.0 | 32.7 | 55.8 | 11.5 |
| Subtotal | 75.6 | 22.2 | 2.2 | 41.7 | 47.1 | 11.2 |
| Words Familiar in Grades 1-3 | | | | | | |
| DRUM | 50.0 | 46.0 | 4.0 | 1.3 | 87.8 | 10.9 |
| LIFT | 52.0 | 44.0 | 4.0 | 5.8 | 82.7 | 11.5 |
| STORM | 34.0 | 62.0 | 4.0 | 4.5 | 80.8 | 14.7 |
| MELTS | 18.0 | 78.0 | 4.0 | 2.6 | 82.1 | 15.3 |
| JAM | 62.0 | 36.0 | 2.0 | 31.4 | 58.3 | 10.3 |
| Subtotal | 43.2 | 53.2 | 3.6 | 9.1 | 78.3 | 12.6 |
| Words Familiar in Grades 4-6 | | | | | | |
| BULB | 14.0 | 80.0 | 6.0 | 1.3 | 86.5 | 12.2 |
| DENTIST | 4.0 | 92.0 | 4.0 | 1.3 | 83.3 | 15.4 |
| MUMPS | 8.0 | 90.0 | 2.0 | 2.6 | 83.3 | 14.1 |
| ADDRESS | 12.0 | 84.0 | 4.0 | — | 83.3 | 16.7 |
| PUMPKIN | 4.0 | 90.0 | 6.0 | .6 | 84.0 | 14.4 |
| Subtotals | 8.4 | 87.2 | 4.4 | 1.2 | 84.1 | 14.7 |
| Totals | 50.7 | 46.2 | 3.1 | 23.4 | 64.9 | 11.7 |

TABLE I-2

Types of reading errors made by first grade i.t.a. and T.O. students on the 58 word reading passage of the Paragraph Reading Test

| Method and Response Categories | Average Percent | |
|---|---|---|
| | Student | Response Category |
| i.t.a. | | |
| Errors not corrected | 16.3 | |
| Words not known | | 62.1 |
| Substitution of words | | 30.1 |
| Omission of words | | 7.6 |
| Insertion of words | | .2 |
| | | 100.0 |
| Errors corrected by student | 0.0 | |
| Read without error | 83.7 | |
| Totals | 100.0 | |
| T.O. | | |
| Errors not corrected | 29.6 | |
| Words not known | | 71.7 |
| Substitution of words | | 25.8 |
| Omission of words | | 2.4 |
| Insertion of words | | .1 |
| | | 100.0 |
| Errors corrected by students | .5 | |
| Words read without error | 69.9 | |
| Totals | 100.0 | |

TABLE I-3

Performances of i.t.a. and T.O. first grade students on the comprehension questions of the Paragraph Reading Test

| Type of Question [1] | Accuracy of Response | i.t.a. Students % | i.t.a. Mode of Response: Word % | Phrase % | Sentence % | T.O. Students % | T.O. Mode of Response: Word % | Phrase % | Sentence % |
|---|---|---|---|---|---|---|---|---|---|
| Factual: Reference to paragraph allowed | Correct | 94.0 | 51.1 | 40.4 | 8.5 | 79.5 | 37.1 | 62.9 | — |
| | Incorrect | 2.0 | — | 100.0 | — | 4.5 | 50.0 | 50.0 | — |
| | Don't know | 4.0 | — | — | — | 16.0 | — | — | — |
| | Totals | 100.0 | | | | 100.0 | | | |
| Factual: Reference to paragraph not allowed | Correct | 84.0 | 2.4 | 76.2 | 21.4 | 68.2 | — | 93.3 | 6.7 |
| | Incorrect | 2.0 | 100.0 | — | — | 6.8 | — | 100.0 | — |
| | Don't know | 14.0 | — | — | — | 25.0 | — | — | — |
| | Totals | 100.0 | | | | 100.0 | | | |
| Inferential: Reference to paragraph not allowed | Correct | 74.0 | 10.8 | 67.6 | 21.6 | 50.0 | 4.5 | 77.3 | 18.2 |
| | Incorrect | 4.0 | 50.0 | 50.0 | — | 9.1 | 25.0 | 25.0 | 50.0 |
| | Don't know | 22.0 | — | — | — | 40.9 | — | — | — |
| | Totals | 100.0 | | | | 100.0 | | | |

[1] A single question was asked for each type of question.

TABLE I-4

Pieces of creative writing produced during the month of April 1971 by i.t.a. and T.O. first grade students

| Method and Teacher[1] | Number Students[2] | Pieces | | Averages | |
|---|---|---|---|---|---|
| | | Number | Range | Student | Schools |
| i.t.a. | | | | | |
| School 1 (1) | 10 | 42 | 2-6 | 4.2 | |
| School 2 (1) | 6 | 8 | 1-2 | 1.3 | |
| School 3 (1) | 16 | 106 | 3-10 | 6.6 | |
| School 4 (1) | 16 | 80 | 1-10 | 5.0 | |
| Totals | 48 | 236 | | 4.8 | 59.0 |
| T.O. | | | | | |
| School 1 (2) | 14 | 64 | 1-13 | 4.6 | |
| School 2 (3) | 3 | 13 | 1-11 | 4.3 | |
| School 3 (1) | 16 | 32 | 1-4 | 2.0 | |
| School 4 (2) | 17 | 38 | 1-5 | 2.2 | |
| Totals | 46 | 147 | | 3.2 | 36.8 |

[1] In first grade the same teachers did not teach both an i.t.a. class and a T.O. class. The number of teachers involved in each school is given in parentheses.

[2] Only students who produced at least one Piece are included in these figures.

TABLE I-5

Books read during the month of April 1971 by i.t.a. and T.O. first grade students[1]

| Method and School[2] | Number Students[3] | Books | | Averages | |
|---|---|---|---|---|---|
| | | Number | Range | Student | Schools |
| i.t.a. | | | | | |
| School 1 (1) | 10 | 61 | 1-19 | 6.1 | |
| School 2 (1) | 10 | 25 | 1-8 | 2.5 | |
| School 3 (1) | 15 | 104 | 3-13 | 6.9 | |
| School 4 (1) | 13 | 87 | 1-19 | 6.7 | |
| Totals | 48 | 277 | | 5.8 | 69.2 |
| T.O. | | | | | |
| School 1 (2) | 13 | 42 | 1-9 | 3.2 | |
| School 2 (3) | 4 | 6 | 1-3 | 1.5 | |
| School 3 (1) | 19 | 81 | 1-14 | 4.3 | |
| School 4 (2) | 6 | 38 | 2-13 | 6.3 | |
| Totals | 42 | 167 | | 4.0 | 41.8 |

[1] The number of books read does not include basal readers.

[2] In first grade the same teachers did not teach both an i.t.a. class and a T.O. class. The number of teachers involved in each school is given in parentheses.

[3] Only students who read at least one book during the month are included in these figures.

Stanford Achievement Test Subtests

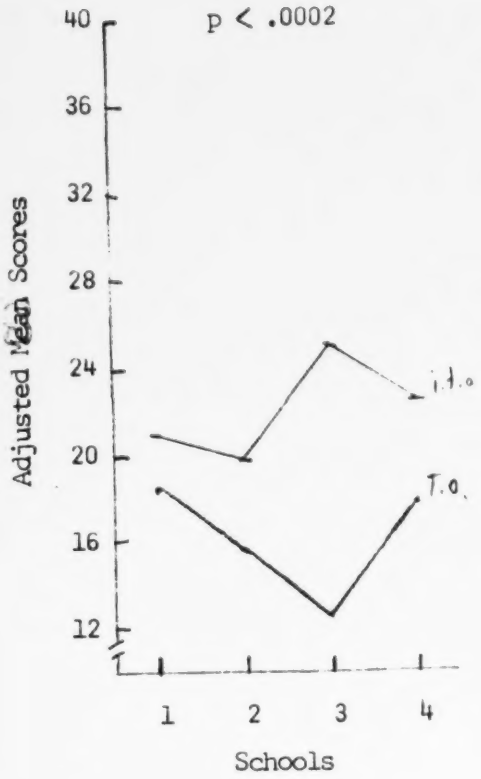


Figure 1.

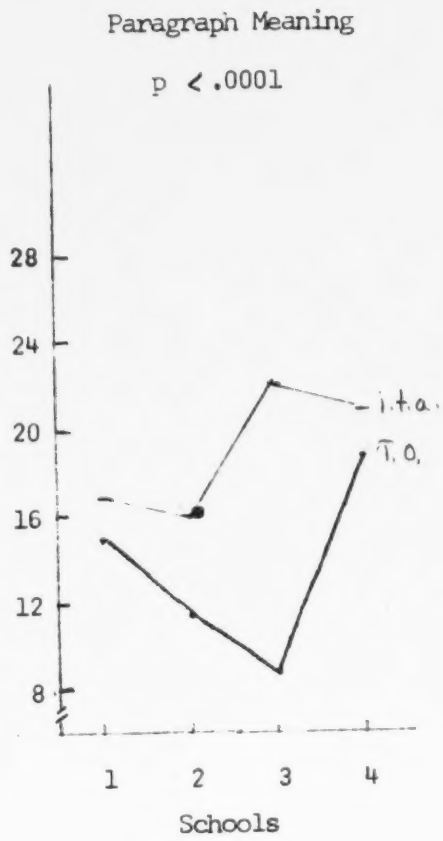


Figure 2.

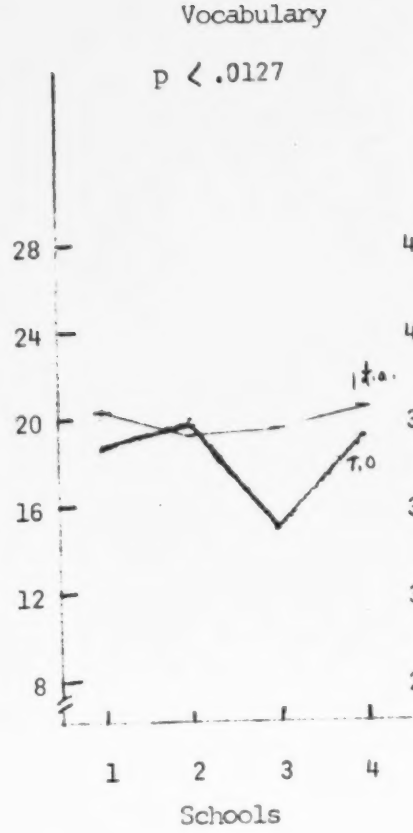


Figure 3.

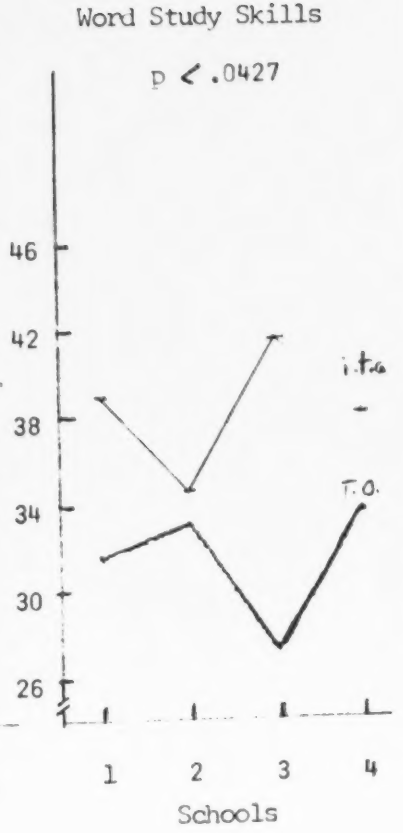


Figure 4.

Spelling

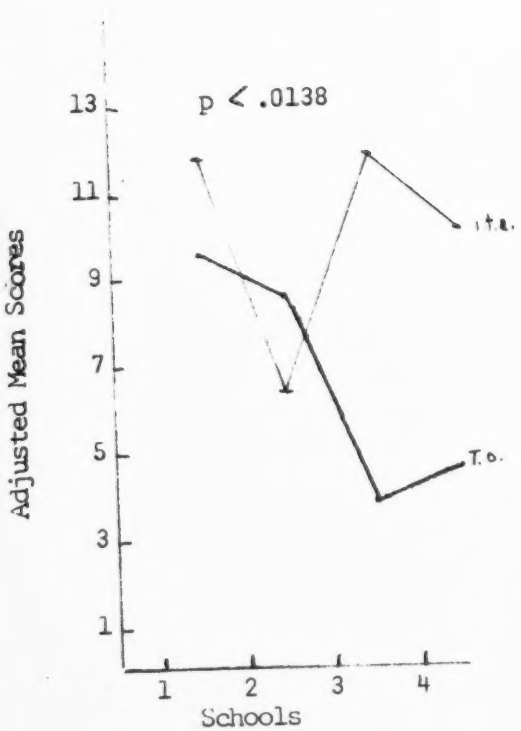


Figure 5.

Paragraph Writing

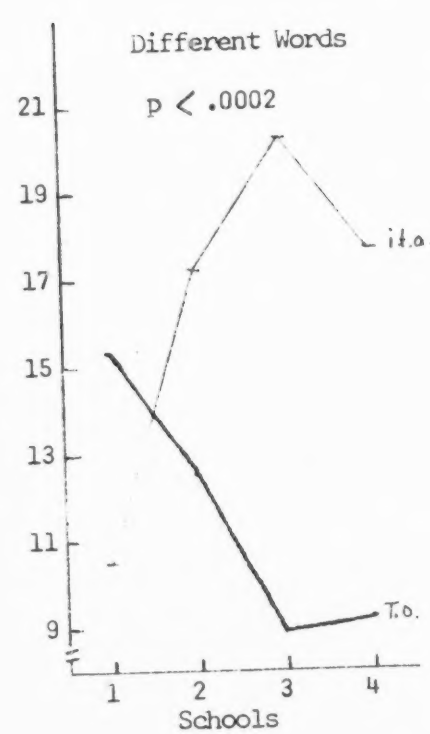


Figure 6.

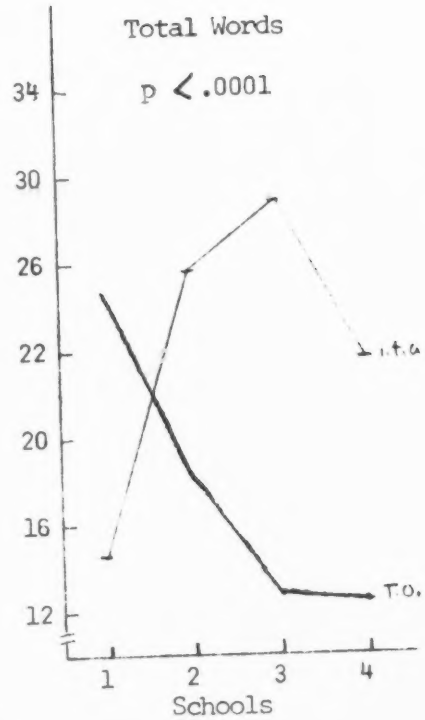


Figure 7.

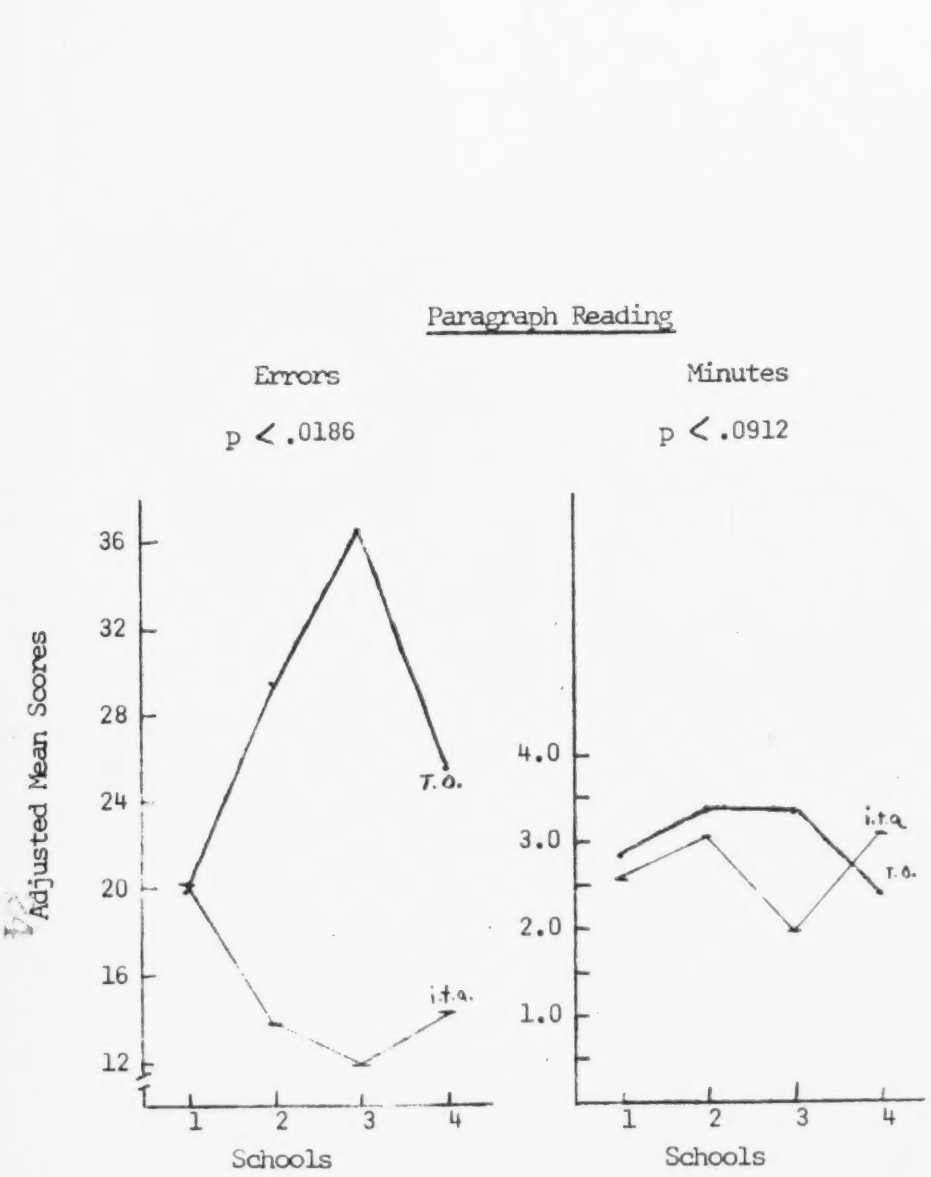


Figure 8.




Figure 9.

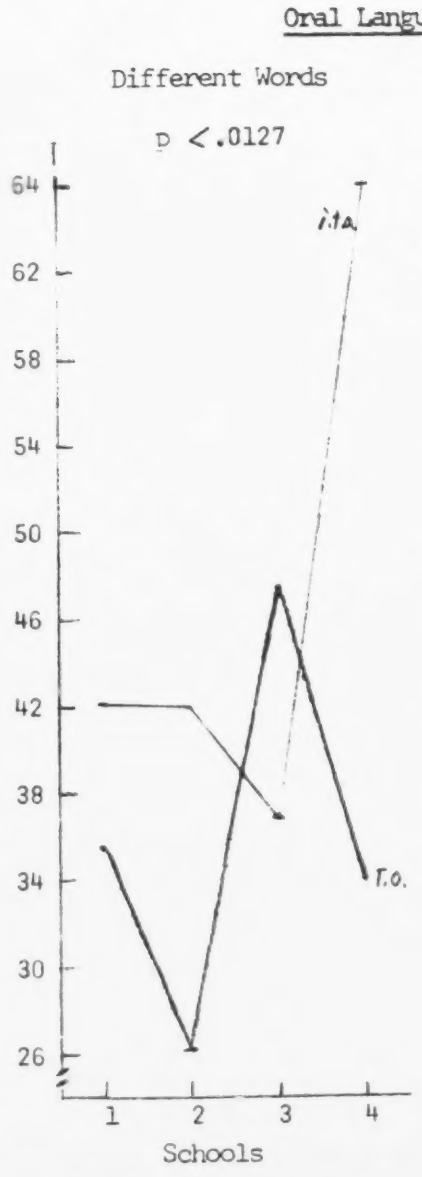


Figure 10.

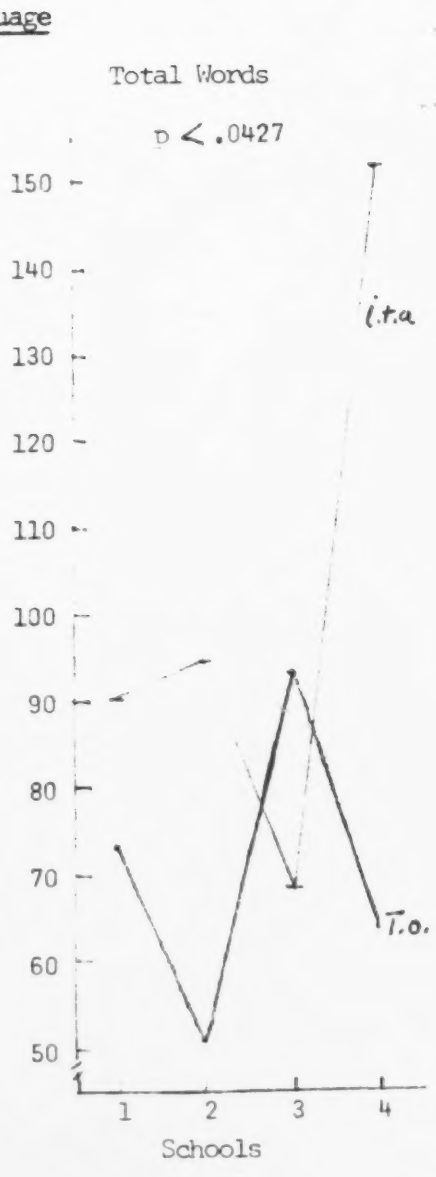


Figure 11.